

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Jacob Hartz Seed Company, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'H4464'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 28th day of February in the year of our Lord one thousand nine hundred and ninety-five.

Attest:

Kenneth F. Evers
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Rich R. L.
Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) JACOB HARTZ SEED CO., INC		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. 85-5061	3. VARIETY NAME H4464
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) P.O. BOX 946 STUTTGART, AR 72160		5. PHONE (include area code) 501-673-8565	FOR OFFICIAL USE ONLY PVPO NUMBER 9200153 Filing Date April 14, 1992 Time <input type="checkbox"/> A.M. <input type="checkbox"/> P.M. Filing and Examination Fee: \$2150.00 Date April 14, 1992 Certificate Fee: \$250.00 Date Dec. 20, 1994
6. GENUS AND SPECIES NAME GLYCINE MAX	7. FAMILY NAME (Botanical) LEGUMINOSEA		
8. CROP KIND NAME (Common Name) SOYBEAN	9. DATE OF DETERMINATION SEPTEMBER 1, 1990		
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) CORPORATION			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION DELAWARE		12. DATE OF INCORPORATION 1984	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS DR. CURTIS WILLIAMS JACOB HARTZ SEED CO., INC. P.O. BOX 946 STUTTGART, AR 72160 PHONE (include area code): 501-673-8565			

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☐ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 4-10-92
- g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)
☐ YES (If "YES," answer items 16 and 17 below) ☒ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☒ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☒ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT [Owner(s)] Curtis Williams	CAPACITY OR TITLE Director and Chief Scientist Proprietors Soybeans and Cotton	DATE 4-10-92
SIGNATURE OF APPLICANT [Owner(s)]	CAPACITY OR TITLE	DATE

EXHIBIT A
ORIGIN AND BREEDING HISTORY

H4464

SUMMER 1982 ORIGINAL CROSS MADE AT STUTTGART, ARKANSAS.
CROSS NUMBER WAS 82032
PARENTS H78-938 X FAYETTE

H78-938 IS D70-3115 X LA74-3850
D70-3115 IS SAME PEDIGREE AS CENTENNIAL
LA74-3850 IS FORREST X MACK

WINTER 1982-83 F1 ADVANCED TO F2 IN GREENHOUSE AT STUTTGART, AR.

SUMMER 1983 F2 ADVANCED TO F3 BY MODIFIED SINGLE SEED DESCENT
AT STUTTGART, AR.

WINTER 1983-84 F3 AND F4 ADVANCED TO F5 BY MODIFIED SINGLE SEED
DESCENT IN BELIZE, C.A.

SUMMER 1984 F5 GROWN AT STUTTGART, AR, AS BULK POPULATION.

SUMMER 1985 F6 GROWN AT STUTTGART, AR., IN PLANT ROWS, SELECTED
ROW NUMBER 5061.

SUMMER 1986 F7 GROWN IN OBSERVATION ROWS AT ST. CHARLES, MO.

SUMMER 1987-91 YIELD TESTED IN HARTZ SEED COMPANY YIELD TEST IN
TN, MO, AR, MS AND LA - AND SCREENED FOR DISEASE
AND NEMATODES, STUTTGART, AR.

SUMMER 1989 GREW BREEDER SEED INCREASE, STUTTGART, AR.

SUMMER 1990-91 SEED GROWN BY CONTRACT GROWERS ONLY.

EVIDENCE OF STABILITY - H4464 is stable and uniform within commercially acceptable limits as indicated by observation of four years of disease screening trials, yield tests and seed increase plots.

KINDS OF VARIANTS - Purple flowering plants producing black hila seed have been observed at a frequency of 0.002% (or 7 seeds per pound) and white flowering plants producing buff or clear hila seed occurs at a frequency of 0.001% (or 3 seeds per pound).

EXHIBIT B

NOVELTY STATEMENT

'H4464' most closely resembles TN4-86 and FAYETTE.

Differences include:

TN4-86 has purple flowers while H4464 has white flowers. Fayette is resistant to race 14 (formerly race 4) of the Soybean Cyst Nematode while H4464 is susceptible.







PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) JACOB HARTZ SEED CO., INC.	TEMPORARY DESIGNATION 85-5061	VARIETY NAME H4464
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) P.O. BOX 946 STUTTGART, AR 72160 ATTENTION: DR. CURTIS WILLIAMS		FOR OFFICIAL USE ONLY PVPO NUMBER 9200153

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g.,). Starred characters ★ are considered fundamental to an adequate soybean variety description. Other characters should be described when information is available.

1. SEED SHAPE:

<input type="text" value="1"/>	2 in some environments			
				
		1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)		2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
		3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)		4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

★ 2. SEED COAT COLOR: (Mature Seed)

<input type="text" value="1"/>	1 = Yellow	2 = Green	3 = Brown	4 = Black	5 = Other (Specify) _____
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3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

<input type="text" value="2"/>	1 = Dull ('Corsoy 79'; 'Braxton')	2 = Shiny ('Nebsoy'; 'Gasoy 17')
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★ 4. SEED SIZE: (Mature Seed)

<input type="text" value="1"/>	<input type="text" value="4"/>	Grams per 100 seeds
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★ 5. HILUM COLOR: (Mature Seed)

<input type="text" value="6"/>	1 = Buff	2 = Yellow	3 = Brown	4 = Gray	5 = Imperfect Black	6 = Black	7 = Other (Specify) _____
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★ 6. COTYLEDON COLOR: (Mature Seed)

<input type="text" value="1"/>	1 = Yellow	2 = Green
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★ 7. SEED PROTEIN PEROXIDASE ACTIVITY:

<input type="text" value="1"/>	1 = Low	2 = High
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★ 8. SEED PROTEIN ELECTROPHORETIC BAND:

<input type="checkbox"/>	1 = Type A (SP1 ^a)	2 = Type B (SP1 ^b)
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★ 9. HYPOCOTYL COLOR:

<input type="text" value="1"/>	1 = Green only ('Evans'; 'Davis')	2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
	3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')	
	4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 286A')	

★ 10. LEAFLET SHAPE:

<input type="text" value="3"/>	1 = Lanceolate	2 = Oval	3 = Ovate	4 = Other (Specify) _____
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11. LEAFLET SIZE:

☐ 21 = Small ('Amsoy 71'; 'A5312')
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

12. LEAF COLOR:

☐ 21 = Light Green ('Weber'; 'York')
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

★ 13. FLOWER COLOR:

☐ 1

1 = White

2 = Purple

3 = White with purple throat

★ 14. POD COLOR:

☐ 1

1 = Tan

2 = Brown

3 = Black

★ 15. PLANT PUBESCENCE COLOR:

☐ 2

1 = Gray

2 = Brown (Tawny)

16. PLANT TYPES:

☐ 21 = Slender ('Essex'; 'Amsoy 71')
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

★ 17. PLANT HABIT:

☐ 3

1 = Determinate ('Gnome'; 'Braxton')

2 = Semi-Determinate ('Will')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

★ 18. MATURITY GROUP:

☐ 0 ☐ 7

1 = 000

2 = 00

3 = 0

4 = I

5 = II

6 = III

7 = IV

8 = V

9 = VI

10 = VII

11 = VIII

12 = IX

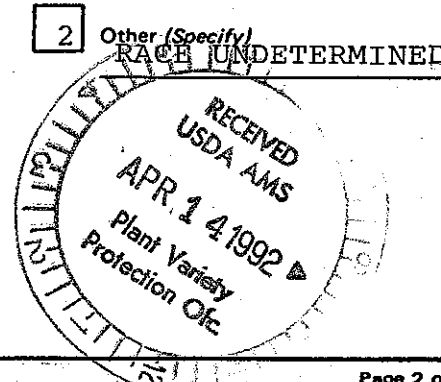
13 = X

★ 19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

★ ☐ 2 Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)★ ☐ 0 Bacterial Blight (*Pseudomonas glycinea*)★ ☐ 0 Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

★ ☐ 0 Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojae*)★ ☐ Race 1 ☐ Race 2 ☐ Race 3 ☐ Race 4 ☐ Race 5☐ 0 Target Spot (*Corynespora cassiicola*)☐ 0 Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☐ 0 Powdery Mildew (*Microsphaera diffusa*)★ ☐ 0 Brown Stem Rot (*Cephalosporium gregatum*)☐ 2 Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

- ★ ☐ 0 Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)
- ☐ 0 Purple Seed Stain (*Cercospora kikuchii*)
- ☐ 0 Rhizoctonia Root Rot (*Rhizoctonia solani*)
- Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)
- ★ ☐ 1 Race 1 ☐ 2 Race 2 ☐ 1 Race 3 ☐ 1 Race 4 ☐ 0 Race 5 ☐ 0 Race 6 ☐ 2 Race 7
- ☐ 0 Race 8 ☐ 0 Race 9 ☐ Other (Specify) 1-RACE 12 : 2-RACE 19

VIRAL DISEASES:

- ☐ 0 Bud Blight (Tobacco Ringspot Virus)
- ☐ 0 Yellow Mosaic (Bean Yellow Mosaic Virus)
- ★ ☐ 0 Cowpea Mosaic (Cowpea Chlorotic Virus)
- ☐ 0 Pod Mottle (Bean Pod Mottle Virus)
- ★ ☐ 0 Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

- Soybean Cyst Nematode (*Heterodera glycines*)
- ★ ☐ 0 Race 1 ☐ 0 Race 2 ☐ 2 Race 3 ☐ 0 Race 4 ☐ 1 Other (Specify) RACE 9 AND 14
- ☐ 0 Lance Nematode (*Hoplolaimus Colombus*)
- ★ ☐ 1 Southern Root Knot Nematode (*Meloidogyne incognita*)
- ★ ☐ 0 Northern Root Knot Nematode (*Meloidogyne Hapla*)
- ☐ 1 Peanut Root Knot Nematode (*Meloidogyne arenaria*)
- ☐ 1 Reniform Nematode (*Rotylenchulus reniformis*)
- ☐ 1 OTHER DISEASE NOT ON FORM (Specify): _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ★ ☐ 0 Iron Chlorosis on Calcareous Soil
- ☐ 0 Other (Specify) _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ☐ 0 Mexican Bean Beetle (*Epilachna varivestis*)
- ☐ 0 Potato Leaf Hopper (*Empoasca fabae*)
- ☐ 0 Other (Specify) _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape		Seed Coat Luster	
Leaf Shape		Seed Size	
Leaf Color		Seed Shape	
Leaf Size		Seedling Pigmentation	

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/POD
				CM Width	CM Length	% Protein	% Oil		
ARTZ VARIETY Submitted H4464	27*	43*	43*			11*	11*	8*	MOSTLY
	119	1.2	86			41.9	22.5	14.4	3
TN4-86 Name of Similar Variety	120	1.3	90			41.5	23.0	13.4	MOSTLY 3

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A₂ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

* NUMBER OF TEST COMPARISONS

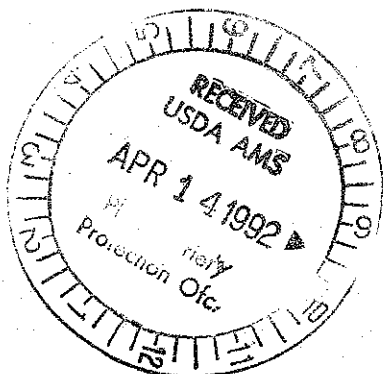


EXHIBIT E

H4464

BASIS OF APPLICANTS OWNERSHIP

Jacob Hartz Seed Company, Incorporated, Stuttgart, Arkansas established a Plant Breeding Program in 1972 for the purpose of developing, releasing, and maintaining stocks of soybean varieties developed by its Plant Breeding Program.

Dr. Curtis Williams, Plant Breeder, was licensed to breed soybeans by the Arkansas State Plant Board, December 9, 1977. Dr. Williams and co-workers developed and tested this variety in trials at Stuttgart, Arkansas, and outlying locations.

On April 23, 1983, Jacob Hartz Seed Company, Inc., was purchased by HybriTech Seed International, Inc., a wholly owned subsidiary of Monsanto, St. Louis, Missouri. Jacob Hartz Seed Company, Inc., was originally incorporated in 1948 in the state of Arkansas. In 1984 Jacob Hartz Seed Company, Inc., merged with the Monsanto-West Africa, Inc., a Delaware Corporation. Jacob Hartz Seed Company, Inc., is the present name of the merged corporation which is a Delaware corporation.

Dr. Curtis Williams is employed by Jacob Hartz Seed Company, Inc. By agreement between employee and Jacob Hartz Seed Company, Inc., all rights to any discovery, development or invention made by an employee are assigned to the company. No rights to the development of this variety are retained by the employee.

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